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First observation of diffraction in proton-lead collisions at the LHC with the CMS detector

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We present the first measurements of diffraction in $\sqrt{s_{NN}} = 8.16$ TeV proton-lead collisions with CMS. The very large angular coverage of CMS is used to tag rapidity gaps in the forward regions on both the proton-going and lead-going sides to identify both pomeron-lead and pomeron-proton topologies. The present data provide essentially unique information for understanding the high energy limit of QCD and modeling cosmic ray air showers since the previous measurement of these processes was done at energy almost 300 times lower ($\sqrt{s_{NN}} = 30$ GeV). The results are compared to predictions from the EPOS-LHC, QGSJET and HIJING event generators.

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